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ABSTRACT

This report presents an evaluation of a project undertaken by the Atlanta, Georgia Public Schools which provided tenth-, eleventh-, and twelfth-grade students with an alternative to the traditional classroom process of learning. By using a multidisciplinary approach to environmental studies, the students were to study independently, conduct productive research, and communicate the results of their studies to elementary and/or secondary students and adults of the community. An additional goal was to give students not only an awareness of natural, urban, and social environmental problems of the Atlanta area and the nation, but also the knowledge and ability to seek solutions to the problems. The report reviews in detail the project goals, objectives, critical variables, participants, management and control operations, the student process or involvement, and evaluation which was conducted. Conclusions and recommendations are also provided. (BL)

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RESEARCH AND DEVELOPMENT REPORT

VOL. VI, NO. 5 AUGUST, 1972

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EVALUATION OF THE PROJECT FOR DEVELOPING AN EXPERIENTIAL CURRICULUM IN ENVIRONMENTAL EDUCATION

1971 - 72

Atlanta Public Schools

Atlanta, Georgia

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RESEARCH AND DEVELOPMENT REPORT

Vol. VI, No. 5 August, 1972

EVALUATION OF THE PROJECT FOR DEVELOPING AN EXPERIENTIAL CURRICULUM IN ENVIRONMENTAL EDUCATION 1971-72

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I. BACKGROUND INFORMATION

The Experiential Curriculum in Environmental Education Project, which is generally called the Environmental Studies Project or ESP within the Atlanta Public Schools, began operation the first day of the winter quarter, November 23, 1971. The project is designed for tenth-, eleventh-, and twelfth-grade students, who, for one quarter, conduct individual environmental studies on topics which they choose. By means of pupil-teacher proposals or contracts, the students earn subject credits in established courses of the Atlanta Public Schools.

In the process of using a multidisciplinary approach to an environmental study the students in the project learn (1) to study independently, (2) to conduct productive research, and (3) to communicate the results of their studies. The students then select an appropriate medium of communication so that the environmental information can be disseminated to elementary and/or secondary students and adults of the community.

The goals and objectives of the project were developed on the basis of three recognized needs:

1. To provide environmental education which gives students not only an awareness of natural, urban, and social environmental problems of the Atlanta area and the nation, but also the knowledge and ability to seek solutions to the problems.
2. To produce environmental materials for use in informing elementary and/or secondary pupils and the community of environmental issues.
3. To provide an alternative to the classroom process of education.

II. GOALS

From the recognized environmental needs of the pupils in the Atlanta Public Schools as well as the needs of the community, the "Experiential Curriculum in Environmental Education" was developed with the following goals:

1. To give each tenth-, eleventh-, and twelfth-grade student an opportunity to develop an awareness of the broad range of problems concerning the natural, urban, and social environments.
2. To allow the student to conduct an environmental study for one quarter thereby gaining a thorough understanding of a specific environmental problem which is of great interest to him.
3. To provide the student with an alternative to the traditional classroom process of education by giving him an opportunity to conduct an environmental study for one quarter using a multi-disciplinary approach in order to earn up to twenty academic credits in the main subject areas of science, social studies, language arts, and mathematics and, when applicable, subjects such as photography and computer science.
4. To require each student in the project to record his findings in a format such as a written report, a film, or a slide lecture which will be communicated to elementary pupils and/or high school students and community groups.

III. OBJECTIVES

The objectives were based on the recognized needs of the pupils and the goals of the project and are as follows:

1. Each student will choose an environmental problem for independent study and with the team will develop a written proposal which includes the following: (1) the subject areas involved in the study, (2) the units of credit to be received in each subject area, (3) the instructional requirements for receiving credit, (4) the research method and resources to be used in conducting the study, and (5) the format for communicating the study. Each student who

conducts an environmental study will receive subject grades based on the specifications of the pupil-teacher proposal. The student with the team determines his subject grades; the team alone rates the overall performance of the student for the quarter.

2. The students will gain significantly (at the .05 level) in environmental awareness as demonstrated by the pretest and posttest of the National Environmental Test.

3. Each student will communicate to elementary pupils, high school students, or a civic group his environmental study by such means as a written report, a film, or a slide lecture.

4. Each student will submit to his lead teacher an abstract of his study which includes the objectives of the study, the type research design and statistics used, a summary of the processes, the alternative solutions to the environmental problem, his conclusions, and the format for communication.

IV. CRITICAL VARIABLES

There were certain key variables which would influence the success of the project. The identified student variables were as follows:

1. Self-concept
2. Attitudes toward independent study
3. Environmental awareness
4. Attendance.

V. PARTICIPANTS

After the initial quarter of operation, the project was opened to all interested Area III students from grades ten through twelve. (The six high schools of Area III are Northside High School, Dykes High School, Archer High School, Grady High School, Howard High School, and North Fulton High School.) Two students from North Fulton High School transferred to Grady High School for the spring quarter.

The criteria for acceptance of students into the project were as follows: (1) a written application stating desire to conduct an individual environmental study and (2) two recommendations from high school teachers.

There were 67 participants at Northside High School during the two quarters and 35 participants at Grady High, making a total of 102 students served during the two quarters. Information regarding sex, race, and grade level is listed in Table 1.

TABLE 1

PARTICIPANTS INFORMATION

	Winter Quarter	Spring Quarter	Total
Sex			
Boys	23	9	32
Girls	57	13	70
Race			
Black	10	3	13
White	70	19	89
Grade Level			
Grade 9	0	1	1
Grade 10	18	5	23
Grade 11	19	2	21
Grade 12	43	14	57
Participants by School			
Northside Participants	55	12	67
Grady Participants	25	10	35
Total Project Participants	80	22	102

VI. MANAGEMENT AND CONTROL

The following staff positions were specified in the proposal for FY 72: A coordinator and a secretary who would be based at the project's central office and a curriculum media specialist, a lead teacher, three team teachers, an educational aide, and a secretary who would be based at each of the two schools involved in the project. A research assistant serving one-half time, a statistician, and a half-time secretary were to be based at the office of the Research and Development Division of the Atlanta Public Schools.

The proposal specified that a maximum of one hundred students per school would be involved in the project each quarter. However, this number was recognized as being unrealistic. As a result, fewer students than specified participated in the project, and the superintendent for Area III did not approve the hiring of the educational aides.

The staff at Northside High School included the full-time service of a curriculum media specialist and a lead teacher whose teaching area was mathematics. The three team teachers, representing science, social studies, and English, worked with the project on a part-time basis and taught additional classes in the traditional school program. A full-time secretary was assigned to the Northside program.

The staff of the Grady High School project included the full-time services of a curriculum media specialist, a lead teacher, and a secretary. One team teacher representing science served on a part-time basis. The lead teacher, whose instructional area of expertise was social studies, served as adviser for that subject and the curriculum media specialist, in addition to her assigned duties, served as adviser for English.

The central project office, which was located at Northside High Schcol, also functioned as the office for the Northside project. The coordinator and her secretary were based there.

What were the responsibilities and functions of each of the staff members? Detailed job descriptions which clarified the roles of the project personnel were developed by the project coordinator and the representative of the Area III administrative staff.

The coordinator for the project directed the activities and worked with all personnel concerned to achieve the goals of the project; acted as representative and liaison with the community at large in reference to the project; studied reports and feedback from the staff to redirect personnel or to clarify and/or redefine objectives; reviewed current research, appraised innovations, and facilitated their implementation into the instructional program; directed the planning and provision of inservice training, workshops, demonstrations, and special programs for professional growth of all project personnel; planned seminars and field trips for students in order to promote environmental awareness; and accounted for the expenditures of all funds.

The coordinator delegated certain responsibilities to each of the instructional staff in order to provide maximum instructional efficiency. The media specialist assisted the coordinator in all her activities, aided participants in identifying available research sources, identified and acquired environmental materials relevant to the program, disseminated project information to the participants, aided participants in selecting appropriate media and then communicating the results of their studies, and coordinated the activities of the secretary at the school.

The lead teacher coordinated the activities of the team teachers, served as an advisor to participants in his subject area of expertise, served as liaison between the team and the coordinator, aided the team in identifying and meeting the specific participant needs, organized and assumed the responsibility for the students record file, collected abstracts of the studies from each participant, directed the filing of the abstracts at the local level by the secretary, and sent copies of each abstract to the coordinator and the research assistant.

The team teacher served as an advisor to a group of participants in developing of the pupil-teacher proposals and identifying research problems, served as a resource person for participants in his subject area of expertise, determined the academic credit in his instructional area to be given to each participant, and met with the lead teacher and the other team teachers in the discussion of each participant's study.

The research assistant and statistician were based in the office of the Research and Development Division of the Atlanta Public Schools. They communicated with, but were separate from, the instructional staff. The research assistant and the statistician assumed primary responsibility for project evaluation and for processing the statistical data relating to the project. The research assistant disseminated the information concerning the project through written progress and evaluation reports.

The project coordinator and her staff worked under the immediate direction of the Area Superintendent of Area III with additional support and counsel from the Assistant Superintendent for Instruction and the Assistant Superintendent for Research and Development.

The coordinator worked closely with the principals of Northside and Grady high schools. This communication was imperative not only because the project was based at these schools, but also because the project's professional staff, who were based at these schools, were members of the faculties and were responsible to the principals.

VII. PROCESS

Using the feedback from winter quarter participants, the coordinator made changes in the project spring quarter. The orientation period was extended from three days to three weeks during which time, in addition to being introduced to environmental concerns, the students were taught to use the library and to conduct independent research.

The method chosen for teaching library skills was to ask each student to choose one article from a notebook of articles collected by the staff. For this mini-research module, the students were required to collect at least one encyclopedia reference, two periodical references, two books containing information on the topic, three agencies which might be helpful in research on the topic, and one film related to the topic. The students were asked then to suggest a local problem, related to the topic, which might be studied.

The coordinator of the project with Dr. Vernon W. Stone of Georgia State University determined the basic research techniques necessary in conducting environmental research, and Dr. Stone developed a manual for the participants. (Although Dr. Stone has stated that the manual is designed for high-ability students, academic record is not a criterion for acceptance of students into the program.)

The requirements of the project were specified during the orientation. In addition, the students were given the information regarding evaluation.

Each student chose an environmental topic and worked individually under the guidance of an adviser in writing his proposal. One team member served as adviser to the students; the other members of the team guided the student in

their particular areas of expertise. Each proposal included the following information:

1. Statement of major goal(s) or objective(s)
2. Statement of minor or "expediting" goals
3. List of information and/or skills needed to conduct the study
4. List of specific resources for accomplishing learning (grouped together under headings, such as Books, Films, Filmstrips, Records, Tapes, Interviews, Workbooks, Periodicals, etc.).

Dependent upon the topic chosen for study and the nature of the research required for the study, the student with the team determined the subject areas and the amount of credit he would receive for his study. The student received up to ten credits in one subject area and a total of twenty credits for participation in the project.

Since the student was encouraged to use a multidisciplinary approach to his study, he was able to receive credit for existing secondary courses of Atlanta Public Schools in the subject areas of English, mathematics, social studies, and science although he was not limited to these subject areas. For example, he could, in making a film, fulfill the objectives of the photography course and receive credit in photography.

How was it possible to give credit in already existing secondary courses which are taught in the classroom? Atlanta Public Schools had developed behavioral objectives for each course offered on the secondary level. Therefore, if the participants in the project met all the objectives in the process of conducting their studies, they received course credit. When all the objectives were not met, the team teacher specified the additional work to be done by the student in order to fulfill the objectives.

The total procedures by which each student earned course credit was outlined in special pupil-teacher proposals which specified the particular course objectives and the manner in which they would be met. The proposal was signed by both the student and the team teacher for the particular subject area and each kept a copy.

In addition to meeting with the team a minimum of one time per week, the students in the project worked closely with the curriculum media specialists. The curriculum media specialists aided the students in locating research sources and in developing the media for communicating their findings. When necessary, the curriculum media specialists served a dual role by acting as a team member for a particular subject area.

The participants were not released from daily attendance at school until all signatures were obtained on the checklist for the completion of orientation. The checklist was signed by staff members as the student completed the mini-research module, provided vital participant information, submitted the research article study, submitted a tentative proposal which was approved, and arranged for course credits.

After completion of the orientation, pupils began working on their individual studies. A list of resources for environmental education was given to each student in the program. They received also a list of books concerning the environment.

Although the participants were released from structured classes for the quarter; a student who was sincerely interested in participating in the project, but was involved in sequential courses such as trigonometry or a foreign language, was allowed to continue one or two such courses in addition to the project. He, therefore, could take 20 credit hours through the project and 10 credit hours outside the project, making a total of 30 credit hours during the quarter.

An important culminating activity of the quarter's work for each pupil was to assemble, organize, and prepare his new curricular materials for presentation to others. Team teachers and the curriculum specialist assisted the pupils in arranging presentations of their findings to groups of pupils in elementary or high schools or to civic groups in local community; thus, informing them of environmental problems and alternative solutions to the problems. This list of the studies conducted by the students is in Table 2 on page 10.

TABLE 2

LIST OF STUDIES CONDUCTED BY THE STUDENTS

NATURAL ENVIRONMENT

- Domestic Animals and Wildlife
  - Animal Extinction: Unnecessary Killing of Wildlife
  - How Can Game Management Work With and For the Public to Protect Our Endangered Species of Big Game Animals?
  - In Our Environment, Is the Horse Doomed for Extinction?
  - Man-Made Environmental Changes Affecting Wildlife
- Man and Nature
  - Action Taken Against Soil Erosion by Atlanta Industrialists
  - The Environment of the Cherokee Indians
  - An Environmental Look at the Qualla Boundary in Cherokee, North Carolina
  - How Toxoplasmosis Has a Direct Effect on the American People
  - Our Vanishing Wilderness: How Efficiently Are We Utilizing Our Two Main Natural Resources, Land and Water?
  - *Reforestation As a Means of Re-Establishing a Control in the Environment for Beauty and Conservation
  - What Efforts are Being Made by the Georgia Power Company to Improve the Environment?
- Pollution
  - Bacterial Pollution of the Chattahoochee River
  - Cause and Effects of Lead Pollution in Water
  - DDT's Effect on Our Environment
  - The Connection Between Sewage in the Chattahoochee River and the Incidence of Hepatitis Cases in a Selected Area South of Atlanta
  - *The Effect Riverbend Apartment Complex Has on the Chattahoochee River
  - *Flint: The River Speaks for Itself
  - How Does Sound Affect the Musicians of Today's Society?
  - Noise Pollution
  - Noise Pollution and Mice
  - Pollution in the Chattahoochee River
  - A Study of Environmental Pollution by Individuals and of Possible Steps to Reduce It
  - A Study of the Air Pollution from a Specific Factory in an Atlantan Community
  - **The Water Quality of the Peachtree Creek Basin in Terms of Microorganisms
- Recycling
  - The Recycling of Metal
  - Man and Nature's Utilization of Solid Waste Materials
  - Recycling of Metals and Rags

*Studies for which students received Presidential Environmental Merit Awards.

**Studies for which students received a Presidential Environmental Excellence Awards.

Table 2 (cont'd.)

SOCIAL ENVIRONMENT

Drug Addiction
- What Are the Negative and Positive Aspects, Sociologically and Physiologically, in the Use of Methadone for Treating Heroin Addiction in Atlanta?

Economy
- The Effects on the Environment of the High Cost of Pollution
- The Materialistic Value System
- An Investigation of a Non-Consuming Economy -- It is Necessary, But Is It Feasible?

Education
- Attitudes of 10th, 11th, and 12th Graders at Northside High School
- Causes of Neglect of Art and Art Appreciation Among the Youth of Atlanta
- Effects of an Environment of Deprivaton on Learning in Children
- The Educable Mentally Retarded Adolescent in Public Secondary Schools
- The Emotionally Disturbed Child in the Classroom
- Environmental Awareness Survey in Area III of Atlanta Public Schools
- Learning Can Be Fun
- Making Inner City Children Aware of the Natural Environment
- The Need for Environmental Education: How Can a Program Such as This Be Evaluated?
- A Survey of the Attitudes of High School Age Students Towards The Ecology Movement and Environmental Crisis
- *Teaching First Graders About Various Kinds of Pollution
- There's Nothing New Under the Sun -- A Study of Environmental Problems That Have Existed Through Ancient Times
- What Has Been the Effect of the "American Way of Life" on Jewish Education?
- *When Teaching Nine Through Twelve Year Old Children About the Environmental Crisis: What Teaching Method is Best to Use? The Methods are: E.S.A., and Experiment and Discussion

Juveniles
- The Effects of Violence Toys on Children's Behavior
- How Does the Aid to Families with Dependent Children (AFDC) Effect the Environment of the AFDC Family?
- How to Improve the Atlanta Environment for the Deaf
- Crime and Juvenile Delinquency in Fulton County, Atlanta
- Juvenile Detention System: A Study of the Courts, Homes and Probation System
- One Aspect of the Government's Concern for the Human Environment: Foster Children
- What Effect a Two-Week, Intergroup, Cultural Interchange Camping Program, Held in an Outdoor Setting, Had Upon Children Between the Ages of Eight and Twelve

*Studies for which students received Presidential Environmental Merit Awards.

Table 2 (cont'd.)

Population
- Abortion On Demand As a Population Control
- Attitudes of Spanish Americans toward Population Control
- The Effects of Deficiencies in Vitamins B_1 and D During Pregnancy
- Effects of Early Pregnancy on High School Girls
- How Can Birth Control Be More Effectively Handled in the Atlanta Area?
- How VD Affects the Teenage Population of Atlanta?
- Is Homosexuality Mady by Environmental Influence
- Solving the Problem of Overpopulation by Birth Control
- What Environmental Factors Have Caused Venereal Disease to Increase?

Religion
- What Effect Do Young People Have on My Church?
- What Is Anti-Semitism and How Can We Solve It?

Television
- The Effects of Environmental Oriented Commercials on the Environment
- An Environment of Television: How Does it Influence the Average Atlanta Ten-Year-Old?

Miscellaneous
- The Reality of the Metaphysical Environment
- A Selected Survey of Ego-Centric Philosophy as a Cause of Pollution

URBAN ENVIRONMENT
- The Effects of Noise and Cities on Squirrels
- Environmental Contrasts Revealed in a Study of Two Atlanta Communitites — Perry Homes, A Federal Housing Project, and Ansley Park, an Established Residential Area
- *Housing Patterns in Atlanta
- *How Adequate Is the Emergency Medical Care Available to Densely Populated Urban Areas?
- Pollution in the Air and in the Sewer System of Atlanta
- Rapid Transit is Coming: What Happens to the Residents and Their Land?
- Rat Control in Urban Atlanta
- A Study of the Simulated Natural Environment in Downtown Atlanta
- A Study of Urbanization as it Relates to Violent Crime in Atlanta (1960-1970)

*Studies for which students received Presidential Environmental Merit Awards.

At the end of the quarter, the student with the team determined his grades in the various subject areas. Grades of A, B, C, D, and F were given. Secondly, the student's overall participation in the project was evaluated. There was the independent study performance rating sheet and the performance in environmental studies rating sheet. These sheets were placed in the permanent record files of the students. A third evaluation for the pupils concerned the material which the students produced.

Seminars and field trips were designed to promote environmental awareness and environmental knowledge of various issues. Students were required to attend these activities. In addition, the students were given the "Environmental Action Guide" which was adapted from Career Education in the Environment published by the Olympus Research Cooperation.

VIII. EVALUATION

The internal evaluation of the performance of the participants at Grady High School and Northside High School was conducted by the team teachers and the curriculum media specialists of the respective projects. Individual course grades were determined by each student with his team adviser for the particular subject area; the grades were based on the degree to which the student fulfilled the objectives outlined in his proposal for course credit.

Credits were earned during the two quarters in the courses listed in Table 3 on page 15. Each course was taken for 5 hours of credit. In addition, because many of the students were involved in sequential courses such as a foreign language, each student in the project was allowed to take two courses (10 credit hours) in the traditional school program. However, courses taken outside the project are not listed.

Course credits earned by individual participants are listed in Table 4, on pages 16 through 20. The students were allowed to take up to ten hours (two five-hour courses) in one subject area and a maximum of twenty hours through the project. The courses for credit were determined by the choice of topic for study. Although a multidisciplinary approach was used in each individual study, no course credit was earned unless the established course objectives were met.

In addition to course grades, the students were rated by the staff on their ability to conduct independent research and on their overall project performance. The ratings sheets were placed in the student's permanent record file.

The external evaluation made use of the following: (1) a self-concept inventory, (2) an instrument for measuring the change in environmental awareness, (3) an instrument for assessing the attitudes of the participants toward the project and independent study, and (4) an instrument for assessing the attitude toward the project of the faculties of Northside and Grady high schools.

The self-concept inventory, What Would You Do? was given one time during the winter quarter and as pretest and posttest during the spring quarter. The inventory was developed by the Instructional Objectives Exchange, P. O. Box 24095, Los Angeles, California, and was designed for secondary pupils.

The inventory consists of twenty items. For each item there are four possible responses: two reflect a positive self-concept and two reflect a negative self-concept. The number of positive responses determines the score and deals with the following dimensions: need to accommodate, expectations of acceptance, courage to express opinions, willingness to participate, and expectations of success.

TABLE 3

COURSES FOR CREDIT
WINTER AND SPRING QUARTERS, 1971-72

English	211	Mass Media
	301	Basic Composition
	321	Oral Language
	324	Drama for Modern Man
	327	Composition
	341	Introduction to Journalism
	361	Drama
	401	Language Development
	406	Trends of Contemporary Literature
	407	Literature of the Western World
	427	Advanced Composition
	443	Humanities VI
Social Science	205	Personal Economics
	212	Field Study Geography
	214	Problems in Urban Development
	215	20th Century World
	241	Earth Materials
	301	Development of U. S. Democracy
	306	U. S. Law
	307	U. S. Social Structure
	309	Adolescent Culture
	401	Contemporary Economic Problems
	404	Social Dynamics
	405	Cultural Area Study
	407	Leadership/Group Process
	408	Comparative Cultures
	410	Introduction to Psychology
Science	313	Biology
	443	Human Biology
	445	Microbiology
	447	Ecology
Math	200	Computer Science
	213	Basic Mathematics C
	313	Basic Mathematics F
Art	313	Photography

TABLE 4

INDIVIDUAL COURSE CREDITS
SPRING AND WINTER QUARTERS, 1971-72

Northside Participants	English Course No.	Grade	Social Science Course No.	Grade	Science Course No.	Grade	Math Course No.	Grade	Other Course No.	Grade
1	341	D	214	C	443	D				
2	341	D	404	B	443	B				
3	341	F	214	D	443	F				
4	341	B	214	B						
5	361	B	401	B						
	341	C								
6	341	D			443	B				
7	211	D	404	D						
8	427	B	407	A	447	A				
	321	A								
9	211	A	215	A	443	B				
10	211	A	307	A	443	A				
11	341	A	214	A						
			408	A						
12	341	C	401	B						
13			404	D	443	D				
			309	D						
14	427	B	404	A						
15	406	A	309	A						
			404	A						
16	401	A	405	B						
			214	B						
17	341	D	404	C			213	B		
18	341	A	405	B						
			307	C						
19	341	A	214	A	443	A				

TABLE 4 (cont'd.)

Northside Participants	English Course No.	English Grade	Social Science Course No.	Social Science Grade	Science Course No.	Science Grade	Math Course No.	Math Grade	Other Course No.	Other Grade
20	341	A	214	A	443	A				
21	443	C	214	C	341	C				
22	341	C	214	B	443	A				
23	321	A	212	A	447	A				
	341	C								
24	321	A	407	A						
			404	A						
25	321	C	404	D	443	D				
26	341	B	309	A						
27	341	C	214	B	443	B				
28	341	C	214	D						
29	341	D								
30	341	F	214	B						
31	321	B	215	A						
	341	A								
32	427	B	404	A						
			407	B						
33	321	B	214	A	443	B				
34	341	C	214	D						
35			214	F						
36	401	A	404	A						
	321	A	407	A						
37	401	A	404	A						
	321	A	309	A						
38	341	D	212	C	447	C				

TABLE 4 (cont'd.)

Northside Participants	English Course No.	English Grade	Social Science Course No.	Social Science Grade	Science Course No.	Science Grade	Math Course No.	Math Grade	Other Course No.	Other Grade
39	341	A	214	A	447	C				
40	341	A	404	B						
	321	A	407	B						
41	341	A	401	A						
			301	A						
42	341	B	306	A						
			307	B						
43	341	B	404	C						
44	341	A	404	A	443	A				
	321	B								
45	341	F	317	F			200	D		
			309	F						
46	321	A	214	A						
			401	A						
47	341	D					313	C		
48	314	A	214	A						
49	341	F			443	F	213	D		
50	214	A	341	A						
51	341	A	241	A						
52	211	A	405	A			311	A		
53	314	A	214	A	433	A				
					445	A				
54	321	A	405	A						
55	211	A	212	A	443	A	213	A		
56	341	B	214	A	443	B				
57	427	A	214	A	443	A				

TABLE 4 (cont'd.)

Grady Participants	English Course No.	Grade	Social Science Course No.	Grade	Science Course No.	Grade	Math Course No.	Grade	Other Course No.	Grade
1			307	F	443	F				
2			307	C	443	D				
3	321	B	307	A						
	301	A	404	A						
4			404	B						
5			205	B						
			404	C						
6	321	C	404	B						
			307	C						
7					447	F				
					443	D				
8			307	F						
			404	F						
9	324	A	404	C						
	407	C								
10	321	B	404	B	312	B			311(Art)	B
11	301	C	312	C					311 (Art)	B
12	321	C	205	C	443	D				
13	321	A	401	B	443	C				
14			404	C						
			307	D						
15	321	B			312	B			311(Art)	B
16	321	B	404	B						
			307	B						
17			307	C						
18					443	D				

TABLE 4 (cont'd.)

Grady Participants	English Course No.	English Grade	Social Science Course No.	Social Science Grade	Science Course No.	Science Grade	Math Course No.	Math Grade	Other Course No.	Other Grade
19	321	A	410	A	443	B			311(Art)	A
20	321	A	404	B			213	A		
21	321	A			445	A	213	A	311(Art)	A
22	321	B	309	B	443	C			311(Art)	F
23	341	A					213	A	311(Art)	A
24	301	C	214	C	443	D			311(Art)	D
25	327	A	212	B	313	B			311(Art)	A
26	321	C	212	A	443	B			311(Art)	A
27	321	A	404	A	443	B			311(Art)	A
28	321	B			313	C	313	D	311(Art)	A

The mean scores for the winter quarter participants are in Table 5. Participants anonymously answered the questions of the inventory, and the results revealed the participants to be willing to participate, to feel the need to accommodate and the courage to express opinions, but to moderately expect acceptance and success.

TABLE 5

WHAT WOULD YOU DO?
WINTER, 1971-72

	Northside (N=41)	Grady (N=20)
a) Need to accommodate (range 0-2)	1.6	1.7
b) Expectations of acceptance (range 0-4)	2.4	2.0
c) Courage to express opinions (range 0-3)	2.4	2.2
d) Willingness to participate (range 0-6)	5.1	4.9
e) Expectations of success (range 0-5)	3.0	2.9

The results of the inventory which was given as pretest and posttest spring quarter are listed in Table 6. Since the students took the inventory anonymously and since the inventory is designed for group rather than individual analysis, the scores were not matched. However, pretest scores indicated the participants at both Grady and Northside high schools felt a need to accommodate, expectations of success, and the courage to express opinions. While participants from both schools were willing to participate, Northsiders indicated a greater willingness to participate. Students at both schools indicated only moderate expectations of success.

TABLE 6

WHAT WOULD YOU DO?
SPRING, 1972

	Northside			Grady		
	Pre (N=15)	Post (N=12)	t	Pre (N=11)	Post (N=10)	t
a) Need to accommodate (range 0-2)	1.5	1.7	1.02	1.7	1.5	-0.88
b) Expectations of acceptance (range 0-4)	3.0	3.0	0	2.8	2.5	-0.75
c) Courage to express opinions (range 0-3)	2.5	2.6	0.51	2.7	2.4	-1.11
d) Willingness to participate (range 0-6)	5.4	4.3	-2.18*	4.7	4.3	-0.75
e) Expectations of success (range 0-5)	3.2	3.3	0.17	3.1	3.7	1.83

*Significant at .05 level.

Since a major goal of the project was to acquaint students to the current environmental crisis; ventures and field trips were planned to produce a broad understanding of the total environment. A test of environmental awareness was administered at the end of the quarter. The instrument used was the National Environmental Test adapted by Patricia Lynch from the CBS news broadcast by Patricia Lynch and Robert Chandler. It consists of 27 true or false questions and 2 opinion questions. Allowing 4 points for each correct response to the true/false questions, the mean score for Grady High School was 68 and for Northside High School was 64. The passing score for the test was 60.

The participants took the National Environmental Test at the beginning of the spring quarter. The mean score for the Northside participants was 65 and the Grady participants, 76. Since the passing score for the test was 60, the Northside students were recognized as having fair awareness of the environment, while the Grady students had good environmental awareness. In Table 7 on page 24, a comparison by test item of the correct responses of the participants and the national sample is shown.

The environmental awareness posttest was developed by the coordinator of the project with the research assistant. The 27 questions of the posttest concerned subjects similar to the National Environmental Test. In addition, the opinion questions from the pretest were included with the posttest. The percentage of students answering each item correctly is listed in Table # on page 25. The mean score for the Grady pupils on the posttest was 74 and the Northside pupils, 61. Allowing four points for each correct response, a passing score of 60, a range of 60-72 points signifying fair, a range of 76-80 points signifying good, and 92 or above signifying excellent (the same procedure used in scoring the National Environmental Test), the participants at both schools demonstrated a fair knowledge of the environment at the end of the quarter.

TABLE 7

NATIONAL ENVIRONMENT TEST
COMPARISON OF CORRECT RESPONSES BY ITEM WITH NATIONAL SAMPLE
SPRING QUARTER, 1974

Question	Subject	CBS NEWS POLL NATIONAL SAMPLE N=4,50 Per cent Correct	NORTHSIDE N=15 Per cent Correct	GRADY N=7 Per cent Correct
1	Air pollution season	28	7	29
2	Oil spillage	22	40	43
3	Lake Erie	68	53	86
4	Nuclear plants	32	53	43
5	Drinking water/sewage	72	80	100
6	Noise	81	100	100
7	DDT	47	80	100
8	Air pollution source	55	73	100
9	Wilderness	37	13	29
10	Water temperature	48	60	57
11	Fertilizer runoff	58	47	57
12	Feed lots	36	27	57
13	Salmon	60	87	100
14	Sewage treatment	30	13	29
15	San Francisco	55	80	100
16	Strip-mining	69	93	86
17	Carbon dioxide	70	53	57
18	Pesticides	75	100	100
19	Alaska Pipeline	43	47	86
20	Hudson	53	87	71
21	Panama Canal	42	66	71
22	Cans/bottles	58	87	86
23	Abandoned cars	40	67	29
24	Garbage	76	80	86
25	Soap/detergent	47	33	57
26	Powder use	25	27	14
27	Population	72	80	100
Non-Scoring Opinion Questions				
1	For conservation	56	100	100
	For progress	34	—	—
	No opinion	10	—	—
2	Against tax deduction for dependent children	60	27	43
	For tax deduction for dependent children	29	67	57
	No opinion	11	7	—

TABLE 8

ENVIRONMENTAL AWARENESS POSTTEST
SPRING QUARTER, 1972

Question	Subject	NORTHSIDE N=12 Per Cent Correct	GRADY N=10 Per Cent Correct
1	Air pollution season	42	10
2	Oil spillage	50	30
3	Pollution of lake/rivers	83	90
4	Nuclear plants	92	80
5	Drinking water/sewage	92	100
6	Noise	100	90
7	DDT	50	90
8	Air pollution source	83	100
9	Wilderness	8	50
10	Water temperature	33	60
11	Fertilizer runoff	75	90
12	Feed lots	25	60
13	Fish in polluted rivers	67	60
14	Sewage treatment	17	40
15	Bays and harbors	33	80
16	Strip-mining	92	100
17	Carbon dioxide	67	90
18	Pesticides	100	90
19	Alaska Pipeline	33	80
20	Natural gas	42	80
21	Panama Canal	33	20
22	Cans/bottles	75	80
23	Abandoned cars	50	80
24	Garbage	8	30
25	Soap/detergent	58	40
26	Powder use	83	100
27	Population	25	20
Non-Scoring Opinion Questions			
1	For conservation	90	100
	For progress	—	—
	No opinion	10	—
2	Against tax deduction for dependent children	30	42
	For tax deduction for dependent children	60	50
	No opinion	10	8

The Student Questionnaire, an instrument developed specifically to assess the attitude of the students toward the project, was administered at the end of both quarters. The questionnaire and the responses of the students are listed in Table 9 on page 27. The questionnaire was answered anonymously by the students.

When asked what they had gained most from the project the typical answers for both quarters were as follows: (1) self-discipline, (2) how to study independently, (3) better study habits, (4) better understanding of the environment, (5) good research techniques, and (6) self-confidence.

The complaints during the winter quarter were related to the following: (1) required attendance at seminars and field trips, (2) lack of structure at the beginning of the project, (3) additional project requirements added as the project progressed, and (4) work in addition to the study to receive course credits.

The students were asked for suggestions in improving the project. The typical suggestions were as follows: (1) give a listing of requirements and rules to each student at the beginning of the quarter, (2) provide a more intensive orientation, and (3) schedule the deadline dates at the beginning of the quarter. The three suggestions were accepted by the staff of the project and the changes were made for the spring quarter.

When the Student Questionnaire was administered at the end of the spring quarter, two frequent suggestions were to place less emphasis on the proposal and to shorten the orientation period. Several Northside students suggested placing emphasis only on the individual environmental studies rather than involving additional environmental activities. Noting the gap in communication, the staff thoroughly explained the necessity of developing a working proposal before being released from orientation and the need for general environmental awareness to incoming students for the summer quarter.

TABLE 9

STUDENT QUESTIONNAIRE
SPRING QUARTER, 1972

	Number of Responses			
	Northside		Grady	
	Winter (N=44)	Spring (N=12)	Winter (N=17)	Spring (N=10)
1. Why did you choose to participate in the environmental studies project? (You may check more than one answer on this question.)				
(a) because of a strong desire to study the environment	11	3	3	1
(b) because of dissatisfaction with learning in a classroom setting	27	8	6	8
(c) because of a desire to study independently	18	7	12	5
2. Did you have a clear understanding of all project requirements when you entered the program?				
(a) Yes	8	7	2	5
(b) No	36	5	15	5
3. After participating in the project, which method of learning do you prefer?				
(a) having a teacher assign material for study and then test you on the material	7	4	3	0
(b) discovering for yourself what you know to accomplish your independent study, and studying that material, and producing curricular media	37	8	14	10

TABLE 9 (cont'd.)

	Number of Responses			
	Northside		Grady	
	Winter (N=44)	Spring (N=12)	Winter (N=17)	Spring (N=10)
4. Did you have too much freedom in this project?				
(a) Yes	8	1	9	2
(b) No	36	11	8	8
5. In comparison with what you expected of independent study, was this work				
(a) harder than you expected	22	6	9	4
(b) easier than you expected	0	2	1	0
(c) approximately as you expected	22	4	7	6
6. In comparison with the workload of regular classes, did you				
(a) study harder than when attending regular classes	26	6	6	6
(b) study as hard as when attending regular classes	12	4	7	2
(c) study less than when attending regular classes	4	1	4	2
no response	2	1	-	-

TABLE 9 (cont'd.)

	Number of Responses			
	Northside		Grady	
	Winter (N=44)	Spring (N=12)	Winter (N=17)	Spring (N=10)
7. How would you honestly evaluate your study behavior this quarter?				
(a) studied very hard	14	7	0	5
(b) studied an average amount	26	4	14	3
(c) goofed-off	2	1	3	2
no response	2	-	-	-
8. How would you rate your learning this quarter?				
(a) learned more than you would have learned by attending regular classes	29	7	13	9
(b) learned as much as would have learned by attending regular classes	8	3	2	1
(c) learned less than you would have learned by attending regular classes	7	1	2	0
no response	-	1	-	-

TABLE 9 (cont'd.)

	Number of Responses			
	Northside		Grady	
	Winter (N=44)	Spring (N=12)	Winter (N=17)	Spring (N=10)
9. Is it more meaningful for you to study the subjects for which you are getting credit when they are interrelated to your environmental study than to study each one separately?				
(a) Yes	34	9	13	9
(b) No	9	3	4	1
no response	1	-	-	-
10. Do you feel you have learned how to study independently this quarter?				
(a) Yes	40	11	13	9
(b) No	4	1	4	1
11. Do you feel more concerned about the environment after being in the project?				
(a) Yes	35	8	13	10
(b) No	9	3	4	0
no response	-	1	-	-

TABLE 9 (cont'd.)

	Number of Responses			
	Northside		Grady	
	Winter (N=44)	Spring (N=12)	Winter (N=17)	Spring (N=10)
12. Do you feel that your learning and accomplishments in this project are important to the project's staff?				
(a) Yes	27	8	11	7
(b) No	15	4	6	2
no response	2	-	-	1
13. How do you feel you were treated in the project?				
(a) as an individual	33	10	15	8
(b) as one of a group of students	11	2	2	2
14. Would you participate in the project if you knew in the beginning what you know now?				
(a) Yes	25	7	15	7
(b) No	18	4	1	2
no response	1	1	1	1
15. Would you recommend this project to others?				
(a) Yes	23	10	13	7
(b) No	15	1	3	3
no response	6	1	1	-

TABLE 9 (cont'd.)

		Number of Responses			
		Northside		Grady	
		Winter (N=44)	Spring (N=12)	Winter (N=17)	Spring (N=10)
16. Are you employed?					
(a) Yes		15	5	4	2
(b) No		28	6	13	8
no response		1	1	-	-
If yes, how many hours per week?	40 hours	1	2	-	-
	30 hours	1	-	-	-
	20-25 hours	3	-	1	1
	10-15 hours	2	2	1	-
	≤10 hours	2	-	1	-
When do you work?	Weekdays	6	1	-	-
	Saturdays	6	1	-	-
	Both Weekdays and Saturdays	-	2	3	1
17. What did you gain most from the project?					
18. Do you have a gripe about the project?					
19. Do you have suggestions for improving the project?					

A questionnaire to be answered anonymously was sent to the nonproject faculties of Northside and Grady high schools winter quarter. Fourteen of 54 teachers at Grady High School and 20 of the 75 teachers at Northside responded. The results are shown in Table 10.

TABLE 10

TEACHER QUESTIONNAIRE
WINTER, 1971-72

	Responses			
	Northside (N=20)		Grady (N=14)	
	Yes	No	Yes	No
1. Are you aware of the existence of the Environmental Studies project in you school?	20	0	14	0
2. Have you been formally informed about the goals of the program by the school administration of the school?	17	3	13	1
By the project staff?	19	1	10	3
3. Have you been informally informed of the project's progress through the project staff in your school?	14	5	7	7
4. Do you fully understand the purpose of the project?	14	5	10	4
5. Were you initially enthusiastic about the project?	12	8	7	7
6. Has your opinion of the project changed? Why?	1	19	1	13
7. Have you suggestions concerning the project?	14	6	4	10

Of the 18 teachers who made suggestions concerning the project, 14 were positive and 4 were negative. However, the need to overcome the resistance of teachers toward independent study was recognized. To combat the resistance, the staff took two approaches; they allowed the participants an opportunity to demonstrate their findings to members of the faculties and involved classroom teachers in the project. The first approach was keeping with a project objective and programs were planned so that participants could demonstrate their findings. In addition, some teachers invited students to speak to their classes when the topics related to the subject being taught.

To promote faculty involvement in the project, many teachers were asked to participate in the project, many teachers were asked to participate in the mini-conference which was to be held at Northside High School on May 12 and 13, 1972. The Students Toward Environmental Participation Conference was sponsored by the project in cooperation with the Nation Parks Service and the United States National Commission for the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

The cooperation of the nonproject faculties of the participating schools is essential to project success. Therefore, the attitude of the faculties will be assessed again at the beginning of fall quarter, 1972.

IX. CONCLUSIONS

There are four identified critical variables which influence the success of the project. They are self-concept, attitude toward independent study, environmental awareness, and attendance.

The self-concept inventory was administered at the beginning of the winter quarter and revealed that the participants felt the need to accommodate, the courage to express opinions, and the willingness to participate, but had only moderate expectations of acceptance and success. The same was found of the participants entering the spring quarter. The inventory was administered during spring quarter as a pretest and posttest, and there was no significant difference except in one dimension; those students taking the posttest at Northside High School were less willing to participate (significant at the .05 level) than the total Northside group at the beginning of the quarter.

However, many of the students at both Grady and Northside indicated on the Student Questionnaire that they felt they had gained self-confidence during the quarter.

In order to determine attitude toward independent study, specific questions were asked on the Student Questionnaire. The results were that 84 per cent of the winter quarter students and 82 per cent of the spring quarter students indicated they preferred the independent study process of the project to the classroom process of learning and 69 per cent and 73 per cent, respectively, felt that they had learned more than while attending regular classes.

Because each student conducted his own individual study and field trips, and seminars were designed to give him a broad environmental understanding, a general environmental awareness instrument was administered. The students at both Northside and Grady demonstrated a fair environmental awareness winter quarter. The participants at the beginning of spring who were from Northside High School demonstrated fair awareness while the Grady students indicated good awareness. Although both pretest and posttest were administered during the spring quarter, the scores were not matched. This will be done in subsequent quarters.

Although students were required to attend homeroom each morning in order to be counted present at school, the winter quarter students were free to leave school after the one-week orientation period. The result was that many of the students, who were unaccustomed to independent study, improperly scheduled their time and spent much of the quarter working on their proposals. In addition, since attendance at seminars was not initially required, the result was that student attendance at seminars was poor. Many students attended only when the topics directly related to their studies.

Spring quarter students were required to attend school for the entire school day until the pupil-teacher proposals were approved. Once approved, the students were required to attend homeroom each morning, check their personal mailboxes at the Environmental Studies Project office for project information, schedule weekly appointments with team members, and attend project seminars and field trips. There were no student attendance problems during the spring quarter.

X. RECOMMENDATIONS

The staff of the Experiential Curriculum in Environmental Education Project is to be commended for developing an efficient process for teaching research techniques and independent study methods to secondary students. Because the project offers to tenth-, eleventh-, and twelfth-grade students an alternative to the traditional classroom process of learning, the chief concern of the staff should be to involve the maximum number of students each quarter. It is recommended that the staff design a campaign, directed toward the faculties as well as the students of Area III, which will promote the project and establish a means by which students can be personally recruited.